

CLAIMS

1. Apparatus for imaging of the inner structure of the breast, the apparatus comprising:

5 a source of light illuminating the breast when the source of light is situated at a first position of the breast; and

a detector which when situated at a second position relative to the breast, detects light from said source passing through a portion of the breast from the source; wherein the source of light comprises either:

10 a non-laser radiant source and at least one optical filter situated between source and the detector that limits the light reaching the detector from the source to a visible spectral band limited to wavelengths in the range from 490 to 510 nanometers or 520 to 580 nanometers; or

15 a source of laser light operating at an output at between 490 and 510 nanometers or between 520 and 580 nanometers or is a tunable laser light source operating at a wavelength between 490 and 510 nanometers or between 520 and 580 nanometers.

2. Apparatus according to claim 1 wherein the apparatus comprises a non-laser spectral source of light and an optical filter of the at least one optical filters having a lower pass-band limit of 520 nanometers or more and an upper pass-band limit of 580 nanometers or less.

3. Apparatus according to claim 1 wherein the apparatus comprises a non-laser spectral source of light and an optical filter of the at least one optical filters having a lower pass-band limit of 490 nanometers or more and an upper band-pass limit of 510 nanometers or less.

4. Apparatus according to claim 1, wherein the source of light is a non-radiant laser source and including:

a plurality of optical filters;

a filter holder situated between the source and the detector, such that when a filter is placed in said holder light reaching the detector from the source is limited to a

visible spectral band different from that of at least one of the other filters and wherein at least one of the filters transmits in a range outside the red and infra-red; and means for selectively changing the filter in the holder.

5 5. Apparatus according to claim 1 wherein the source of light comprises an incandescent light source.

6. Apparatus according to claim 1 wherein the source of light comprises a high intensity discharge light source.

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7. Apparatus according to claim 1 wherein the source of light comprises a laser source having an output in the visible spectral band excluding red.

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8. Apparatus according to claim 7 wherein the source of laser light has an output at between 490 and 510 nanometers.

9. Apparatus according to claim 7 wherein the source of laser light has an output at between 520 and 580 nanometers.

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10. Apparatus according to claim 7 wherein the laser source provides a tunable laser output.

11. Apparatus according to claim 10 wherein the laser is tunable to a wavelength above 620 nanometers.

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12. Apparatus for obtaining stereotactic images of the interior of a breast, comprising:

at least one source of light illuminating the breast and situated at a first position of the breast;

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at least one matching interface situated, at a second position, on a surface of the breast, which reduces scatter caused by said surface; and

a pair of spaced imaging detectors that view a portion of the breast through said at least one interface and produce images of said portion;

means for viewing the images such that a stereotactic image is perceived by a viewer.

13. Apparatus according to claim 12 and including an optical arrangement for focusing each of the detectors on a same region in the interior of the breast.
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14. Apparatus according to claim 12 wherein the matching interface comprises a surface of a transparent non-porous material and the breast.
- 10 15. Apparatus according to claim 12 wherein the imaging detectors are matrix detectors.
16. Apparatus according to claim 12 wherein the imaging detectors comprise video cameras.
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17. Apparatus according to claim 12 wherein the imaging detectors comprise CCD arrays.
18. Apparatus according to claim 12 wherein the imaging detectors comprise photographic film.
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19. Apparatus according to claim 1 and including a breast cage for supporting the breast during imaging.
- 25 20. A method of imaging a breast comprising:
illuminating the breast;
forming an image of said illumination passing through a portion of the breast;
and
limiting the light used for imaging to a visible spectral band excluding red
30 wherein the visible spectral band is limited to the ranges between 520 and 580 nanometers and between 490 and 520 nanometers.

21. A method according to claim 20 wherein the visible spectral band is limited to a band having a lower band limit of at least 520 nanometers and an upper band limit of below 580 nanometers.

5 22. A method according to claim 20 wherein the visible spectral band is limited to a band having a lower band limit of at least 490 nanometers and an upper band limit of below 510 nanometers.

23. A method according to claim 20 and including:

10 separately imaging the breast at a plurality of wavelengths or wavelength bands, at least one of which encompasses a range outside the red and infra-red.

24. A method according to claim 23, wherein at least one of the images is generated from light having a wavelength greater than 620 nanometers.

15 25. A method according to claim 20 and wherein the wavelengths of light used in producing images such that larger blood vessels are emphasized.

20 26. A method according to claim 20 and including utilizing wavelengths of light in producing images such that fine blood vessels are emphasized.

27. A method according to claim 20 and including utilizing wavelengths of light in producing images such that tumor tissue is emphasized.